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EXAMINER	
GELAGAY, SHEWAYE	

ART UNIT	PAPER NUMBER
2437	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/535,455	AHN ET AL.	
	Examiner	Art Unit	
	SHEWAYE GELAGAY	2437	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 June 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to the Applicant's amendment filed on June 11, 2009.

2. Claims 1, 3-5, 7 and 9-15 have been amended. New claims 16-20 have been added. Claims 1-20 are pending.

Response to Arguments

3. Applicant's arguments filed on 6/11/09 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 7-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 7-20 are objected to because of the following informalities: Claims 7-20 recite "STT" and "STT_R" and "STT_S" multiple times. It is unclear how the STT_R and STT_S are associated with STT and also it is unclear what exactly is the similarities and/or the differences between the "STT", "STT_R" and "STT_S".

6. Claim 13 recites "if the average load of STT_R is smaller than that of STT_s", however, it is not clear from the claimed language what is the difference between STT, STT_R and STT_s. (see rejection above)

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1-2 and 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moran et al. (hereinafter Moran) 7,299,277 in view of Maher, III et al. (hereinafter Maher) US 7,058,974.

As per claim 1:

Moran teaches an apparatus to be connected between a network access unit and a network to be protected, for protecting legitimate traffic from DoS (denial of service) and DDoS (distributed denial of service) attacks, said apparatus comprising:

a high-priority queue; (*figure 40; col. 46, lines 55-58; a high priority queue*)

a low-priority queue; (*figure 40; col. 46, lines 55-58; a low priority queue*)

a queue information table having, for each specific STT (source-based traffic trunk), a service queue for a specific packet having the specific STT, wherein the service queue is the hgh-priority queue or the low-priority queue; (*col. 27, lines 15-17; a priority filter table (CAM), which contains information to the priority flows e.g. address pairs, etc.*)

a packet classifier for receiving a packet from the network access unit, searching the queue information table for a service queue associated with an STT of the received packet, selectively transferring the received packet to the high-priority queue or the low-

priority queue in accordance with the service queue; (*col. 46, lines 53-57; the flows are prioritized into high and low priority flows. High priority flows are stored in high-priority queue while low priority flows are stored in low-priority queues*)

a queue coordinator for receiving information on the received packet from the packet classifier; (col. 27, lines 61-67; col. 45, line 32- col. 46, line 56)

a buffer for buffering outputs of the high-priority queue and the low-priority queue and providing buffered outputs to the network to be protected. (*col. 2, line 15; flow processor filters and buffers the collected data; col. 30, lines 30-32; the buffer space for each queue varies dynamically based on the arrival of classified packet; col. 46, lines 61-62; buffers from low-priority queue can be reallocated to the high-priority queue*)

Moran does not explicitly disclose updating the service queue associated with the STT of the received packet in the queue information table based on a load of the STT of the received packet. Maher in analogous art, however, discloses updating the service queue associated with the STT of the received packet in the queue information table based on a load of the STT of the received packet. (col. 3, lines 7-34; col. 6, line 11-67; col. 7, line 54-col. 8, line 58; col. 11, line 28-col. 12, line 28) Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to modify the system disclosed by Moran with Maher in order to assign data packets associated with a non-validated traffic flow to a low priority queue thereby preventing brute type denial of service attacks designed to clog networks. (Abstract; Maher)

As per claim 2:

The combination of Moran and Maher teaches all the subject matter as discussed above. In addition, Moran further discloses wherein the network to be protected comprises a server. (*col. 4, lines 36; server*)

As per claim 5:

The combination of Moran and Maher teaches all the subject matter as discussed above. In addition, Moran further discloses wherein a maximum load of both the high-priority queue and the low-priority queue is set to be a maximum allowable load of the network to be protected. (*col. 46, lines 61-62; buffers from low-priority queue can be reallocated to the high-priority queue*)

As per claim 6:

The combination of Moran and Maher teaches all the subject matter as discussed above. In addition, Moran further discloses wherein the network to be protected comprises a server. (*col. 4, lines 36; server*)

As per claim 7:

Moran teaches a method of protecting legitimate traffic from DoS (denial of service) and DDoS (distributed denial of service) attacks, by way of an appratus which is connected between a network access unit and a network to be protected and which includes: a queue information table having, for each specific STT (source-based traffic trunk), a service queue for a specific packet having the specific STT, wherein the service queue is a high-priority queue or a low-priority queue, a queue coordinator, and a packet classifier, the method comprising the steps of:

(a) obtaining, by the packet classifier, an STT (STT_R) of a packet received form the network access unit based on a source IP address of the received packet; (*col. 27, lines 15-17; a priority filter table (CAM), which contains information to the priority flows e.g. address pairs, etc; col. 73, lines 26-28; only packets that match a specific set of MAC addresses (source or destination) may be included. Additionally, only packets that include a specific VLAN Group can be included*)

(b) searching, by the packet classifier, the queue information table for the service queue corresponding to the STT_R and checking, by the packet classifier, whether the service queue is the high-priority queue or the low-priority queue; (*figure 40; col. 46, lines 55-58; a low priority queue*)

(c) transferring, by the packet classifier, the received packet to the high-priority queue if the service queue is the high-priority queue in the step (b); (*figure 40; col. 46, lines 55-58; a high priority queue*)

(d) transferring, by the packet classifier, the received packet to the low-priority queue if the service queue is the low-priority queue in the step (b); (*col. 46, lines 53-57; the flows are prioritized into high and low priority flows. High priority flows are stored in high-priority queue while low priority flows are stored in low-priority queues*) and

(e) transferring, by the packet classifier, packet information on the received packet to the queue coordinator; and (*col. 27, lines 61-67; the flow processor to give a set of priority to a set of flows that contain a provisional (or other) address pairs corresponding to packets of interest*)

Moran does not explicitly disclose updating, by the queue coordinator and based on a load of STT_R , the service queue associated with STT_R in the queue information table. Maher in analogous art, however, discloses updating, by the queue coordinator and based on a load of STT_R , the service queue associated with STT_R in the queue information table. (col. 3, lines 7-34; col. 6, line 11-67; col. 7, line 54-col. 8, line 58; col. 11, line 28-col. 12, line 28) Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to modify the system disclosed by Moran with Maher in order to assign data packets associated with a non-validated traffic flow to a low priority queue thereby preventing brute type denial of service attacks designed to clog networks. (Abstract; Maher)

As per claim 8:

The combination of Moran and Maher teaches all the subject matter as discussed above. In addition, Moran further discloses wherein the network to be protected comprises a server. (*col. 4, lines 36; server*)

2. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moran et al. (hereinafter Moran) 7,299,277 in view of Maher, III et al. (hereinafter Maher) US 7,058,974 and in view of Bremler-Barr et al. (hereinafter Bremler-Barr) US 2003/0076848.

As per claim 3:

The combination of Moran and Maher teaches all the subject matter as discussed above. In addition, Moran further discloses wherein the information on the

received packet includes a packet size and an index of the queue information table for representing STT information of the packet (*col. 27, lines 15-17; a priority filter table (CAM), which contains information to the priority flows e.g. address pairs, etc.*). Both references do not explicitly disclose information includes a packet arrival time. Bremler-Barr in analogous art, however, discloses information includes a packet arrival time (*page 5, paragraph [101]; arrival times of the packet*). Therefore it would have been obvious to one ordinary skill in the art at the time the invention was made to modify the system disclosed by Moran and Maher with Bremler-Barr in order to determine the next packet service completion time (paragraph [101]; Bremler-Barr).

3. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moran et al. (hereinafter Moran) 7,299,277 in view of Maher, III et al. (hereinafter Maher) US 7,058,974 and in view of Dobson US 6,650,643.

As per claim 4:

The combination of Moran and Maher teaches all the subject matter as discussed above. In addition, Moran teaches wherein the queue information table has fields including an STT ID, a service queue *col. 27, lines 15-17; a priority filter table (CAM), which contains information to the priority flows e.g. address pairs, etc; col. 73, lines 26-28; only packets that match a specific set of MAC addresses (source or destination) may be included. Additionally, only packets that include a specific VLAN Group can be included*). Both references do not explicitly disclose wherein the queue information table has an average load, a recent load calculation time and a total packet size. Dobson in analogous art, however, discloses wherein the queue information table

has an average load, a recent load calculation time and a total packet size (*col. 6, lines 17-31; after calculating the current load, the load integrator calculates the average load at a pre-defined interval*). Therefore it would have been obvious to one ordinary skill in the art at the time the invention was made to modify the system disclosed by Moran and Maher with Dobson in order to calculate current load and an average load for the processor based on the result from the load calculator performing the load calculator task (col. 4, lines 36-37; Dobson).

4. Claims 9-11, 13-15 and 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moran et al. (hereinafter Moran) 7,299,277 in view of Maher, III et al. (hereinafter Maher) US 7,058,974 and in view of Dobson US 6,650,643.

As per claims 9 and 16:

The combination of Moran and Maher teaches all the subject matter as discussed above. In addition, Moran further discloses (a') calculating an average load of an STT based on the packet information transferred from the packet classifier; (*col. 30, lines 30-67; to manage aggregate packet rate and avoid dropped packets, the expert task monitors the average depth of the priority queue and may selectively discard flows from the priority filter*) (b') selectively resetting the service queue associated with STT depending on the calculated average load of the STT; (*col. 30, lines 30-67; the buffer space for each queue varies dynamically based on the arrival of a classified packet that meet the priority criteria and as the number of flows increases, buffers are reallocated . To manage aggregate packet rate and avoid dropped packets, the expert task monitors the average depth of the priority queue and may selectively discard flows from the*

priority filter) (c') calculating an average load of the high-priority queue; (*col. 46, lines 60-62; Buffers from both the high and low priority queue can be reallocated if the amount of data surpasses a predetermined threshold.*) Both references do not explicitly disclose resetting a certain STT service queue based on the calculated average load of the high priority queue; and storing the reset STT information in the queue information table. Dobson in analogous art, however, discloses (d') selectively resetting a service queue associated with a certain STT depending on the calculated average load of the high-priority queue; (*col. 8, lines 57-64; the load integrator issues a re-start instruction to the load calculator in order to determine the next current load*) and (e') storing the selectively reset service queue in the queue information table. (*col. 8, lines 61-64; the load integrator may calculate and store a current load and an average load for the processor*) Therefore it would have been obvious to one ordinary skill in the art at the time the invention was made to modify the system disclosed by Moran and Maher with Dobson in order to calculate current load and an average load for the processor based on the result from the load calculator performing the load calculator task (col. 4, lines 36-37; Dobson).

As per claim 10:

The combination of Moran, Maher and Dobson teaches all the subject matter as discussed above. In addition, Dobson further discloses storing a modified average load in the queue information table. (*col. 8, lines 61-64; the load integrator may calculate and store a current load and an average load for the processor*)

As per claims 11 and 18:

The combination of Moran, Maher and Dobson teaches all the subject matter as discussed above. In addition, Dobson further discloses wherein the step (a') further includes the steps of: (a'1) calculating a total packet size based on the packet information transferred from the packet classifier; (*col. 6, lines 17-31; after calculating the current load, the load integrator calculates the average load at a pre-defined interval*) (a'2) checking whether it is time to recalculate the average load; (*col. 6, lines 17-31; after calculating the current load, the load integrator calculates the average load at a pre-defined interval*) (a'3) if it is time to recalculate the average load in the step (a'2, calculating a new average load by using a previous average load and a current average load based on the total packet size, and proceeding to step (b'); (*col. 8, lines 50-64; the load integrator discards the oldest prior load and stores the current load, ...the load calculator calculates the average load*) and (a'4) if it is not time to recalculate the average load, proceeding to step (b'). (*col. 8, lines 57-64; the load integrator issues a re-start instruction to the load calculator in order to determine the next current load*)

As per claims 13 and 17:

The combination of Moran, Maher and Dobson teaches all the subject matter as discussed above. In addition, Moran further discloses wherein the step (b') further includes the steps of: (b'1) setting the service queue associated with STT to be the low-priority queue if the calculated average load of STT is greater than an allowable load when the high-priority queue is in a congested state; (*col. 48, lines 5-8; as the priority queue water-level approaches a " minimum head room" threshold, flows are randomly discarded from priority set a, relegating them back to non-priority queue*) (b'2) randomly

choosing one STT which uses the low-priority queue from the queue information table if the service queue associated with STT is the high-priority queue; (*col. 48, lines 8-9; During this time, the flow processor may only service the priority queue)* (b'3) following step (b'2), setting a service queue associated with STT to be the high-priority queue and the service queue associated with STT to be a low-priority queue if the average load of STT is greater than that of the STTs; (*col. 30, lines 30-67; to manage aggregate packet rate and avoid dropped packets, the expert task monitors the average depth of the priority queue and may selectively discard flows from the priority filter*) (b'4) randomly choosing one STT (STTs), which uses the high-priority queue from the queue information table if the service queue associated with STTr is a low-priority queue; (*col. 30, lines 30-67; to manage aggregate packet rate and avoid dropped packets, the expert task monitors the average depth of the priority queue and may selectively discard flows from the priority filter*) and (b'5) following the step (b'4), setting the service queue associated with STTr to be the high-priority queue and a service queue associated with STTs to be the low-priority queue if the average load of an STTr is smaller than that of STTs. (*col. 30, lines 30-32; the buffer space for each queue varies dynamically based on the arrival of classified packet; col. 46, lines 61-62; buffers from low-priority queue can be reallocated to the high-priority queue*)

As per claims 14 and 20:

The combination of Moran, Maher and Dobson teaches all the subject matter as discussed above. In addition, Dobson further discloses wherein the step (c') further includes the steps of: (c'1) determining whether the service queue associated with STTr

after the selective resetting in step (b') is the high-priority queue or the low-priority queue; *(col. 6, lines 17-31; after calculating the current load, the load integrator calculates the average load at a pre-defined interval)* (c'2) calculating a total packet size served through a high-priority queue associated with STTr is the high-priority queue; *(col. 6, lines 17-31; after calculating the current load, the load integrator calculates the average load at a pre-defined interval)* (c'3) calculating an average load of a high-priority queue if it is time to recalculate the average load of the high-priority queue; and *(col. 8, lines 50-64; the load integrator discards the oldest prior load and stores the current load, ...the load calculator calculates the average load)* (c'4) proceeding to the step (d'). *(col. 8, lines 57-64; the load integrator issues a re-start instruction to the load calculator in order to determine the next current load)*

As per claims 15 and 19:

The combination of Moran, Maher and Dobson teaches all the subject matter as discussed above. In addition, Moran further discloses wherein the step (d') includes the steps of: (d'1) obtaining the calculated average load of a high-priority queue from the step (c'); (*col. 48, lines 5-8; as the priority queue water-level approaches a " minimum head room" threshold, flows are randomly discarded from priority set a, relegating them back to non-priority queue*) (d'2) randomly choosing one STT, which uses high-priority queue and setting a service queue of the randomly chosen STT to the low-priority queue if the calculated average load of the high-priority queue indicates that the high-priority queue is in a congested state; (*col. 48, lines 8-9; During this time, the flow processor may only service the priority queue)* (d'3) randomly choosing one STT, which

uses the low-priority queue and setting a service queue of the randomly chosen STT to the high-priority queue if the calculated average load of the high-priority queue is in an idle state; (*col. 30, lines 30-67; to manage aggregate packet rate and avoid dropped packets, the expert task monitors the average depth of the priority queue and may selectively discard flows from the priority filter*) and (d'4) proceeding to the step (e') if the calculated average load of the high-priority queue indicates that the high-priority queue is in stable state or when one of the steps of (d'2) and (d'3) is performed. *(col. 2, line 15; flow processor filters and buffers the collected data; col. 30, lines 30-32; the buffer space for each queue varies dynamically based on the arrival of classified packet; col. 46, lines 61-62; buffers from low-priority queue can be reallocated to the high-priority queue)*

5. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moran et al. (hereinafter Moran) 7,299,277 in view of Maher, III et al. (hereinafter Maher) US 7,058,974 and in view of Dobson US 6,650,643 and in view of Bremler-Barr et al. (hereinafter Bremler-Barr) US 2003/0076848.

As per claim 12:

The combination of Moran, Maher and Dobson teaches all the subject matter as discussed above. In addition, Moran further discloses wherein the packet information includes a packet size and a queue information table index and a corresponding STT. (*col. 27, lines 15-17; a priority filter table (CAM), which contains information to the priority flows e.g. address pairs, etc.*). Both references do not explicitly disclose

information includes a packet arrival time. Bremler-Barr in analogous art, however, discloses information includes a packet arrival time (*page 5, pp. 101; arrival times of the packet*). Therefore it would have been obvious to one ordinary skill in the art at the time the invention was made to modify the system disclosed by Moran, Maher and Dobson with Bremler-Barr in order to determine the next packet service completion time (paragraph [101]; Bremler-Barr).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SHEWAYE GELAGAY whose telephone number is (571)272-4219. The examiner can normally be reached on 8:00 am to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Emmanuel Moise can be reached on 571-272-3865. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. G./
Examiner, Art Unit 2437

/Emmanuel L. Moise/
Supervisory Patent Examiner, Art Unit 2437